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IMPLICATIONS FOR FUTURE POLICY

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Abstract

Farming is in the midst of a major transformation—not only in technology and production practices, but also in size of business, resource (land) control and operation, business model and linkages with buyers and suppliers. This paper describes the fundamental drivers of today's structural change in U.S. agriculture. The impact of the drivers are illustrated by describing some illustrations of the kinds of innovative farming operations that are developing in agriculture, not the typical farms but those who appear to be leading and shaping the new agriculture. Finally, farm policy implications of the transformation of farming to an industrial manufacturing model are discussed.

Keywords: Farm policy, industrialization of agriculture, structural change, biological manufacturing

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The Industrialization of Agriculture: Implications for Future Policy

Farming is in the midst of a major transformation—not only in technology and production practices, but also in size of business, resource (land) control and operation, business model and linkages with buyers and suppliers. The forces driving this transformation are many and widespread including increased quality, safety and traceability demands of processors and consumers of food products; implementation of information and process control technologies that facilitate biological manufacturing of crop and livestock products; adoption of technologies and business practices that exploit economies of size; increased use of leasing and other outsourcing strategies to foster growth and expand options for resource control; and wider adoption of contracting, strategic alliance and cooperative business models to facilitate more effective and efficient vertical coordination in the production/distribution value chain (Boehlje, et. al. (2006)). Both the livestock and grain sectors are changing from an industry dominated by family-based, small and modest size, relatively independent firms to one of generally larger businesses following an industrial business model that are more tightly aligned across the value chain.

So what do the dramatic changes in farming mean for farm policy? This manuscript first describes the fundamental drivers of structural change in agriculture. Illustrations of the impact of these drivers are then provided by describing innovative farming operations developing in U.S. agriculture; not the typical farms but those that appear to be leading and shaping the industry. Finally, the farm policy implications of the transformation of farming to an industrial manufacturing model will be discussed.

<u>Drivers of Structural Change in Agriculture</u>

The drivers or determinants of structural change are numerous and diverse. Below is a description of six of the key drivers of the shift towards a more industrial model for agriculture.

Technology

Technology drives structural change through the form or type of technology that will be used in agricultural production as well as the rate and characteristics of the adopters of the technology. The types of technology that have the potential to be part of the future of the production industry include bio/nutritional technology, monitoring/measuring/communication technology and process control technology. The end result is the prospect of an industry characterized by biological manufacturing of differentiated products for various food and nonfood uses.

New technology has dramatically changed the timeliness constraint that has been a significant limit on the growth potential for many grain operations. The ability to plant and harvest crops during the limited number of suitable field days in the spring and fall without encountering yield penalties is critical to overall efficiency and profitability. The development of guidance and auto-steer technology combined with larger planting and harvesting equipment (36 row planters and 12 row combines) has dramatically altered the timeliness constraint. For example, planting 2000 acres in Illinois, with a 24-row planter, starting April 1, and working 24 hours, there is a 70 percent chance of finishing planting by May 1. If auto-guidance allows 16 hours per day and improves efficiency 5 percent, chances of completing planting by May 1 improve to 85%. With a 36 row planter and auto-guidance, the chances of completing planting by May 1st improve to 90% (Boehlje and Erickson, 2007).

More sophisticated monitoring and measuring technology that is part of precision farming also enables growth of crop operations. If crop production processes can only be monitored by people with unique skills and those resources are costly or expensive to train, the monitoring process limits the span of control to what one individual (or at least a few) can oversee personally. But, if electronic systems can monitor the processes of plant growth (whether it be machinery operations, or the growth process of the crop, or the level of infestation of insects or weeds), fewer human resources are needed for this task and generally larger scale is possible. Crop production can and will move more and more towards improved electronic monitoring and control systems which expand the span of control of a farmer/manager.

Financial/Economic Forces

Economic/financial forces shape the size and other structural characteristics of the firm. These include economies of size/scope and learning, risk and risk mitigation strategies, rental and outsourcing opportunities and costs, financial and capital structure decisions and costs and ownership and operation of the land resource. In addition to new technology and new operating procedures to relax the timeliness constraints, farmers are also using management strategies and new business models to more fully utilize their machinery and equipment. One of those strategies is multi-site production. Growers are increasingly producing in more than one locale, and in many cases are choosing those locales based on weather patterns, access to water, and transportation/logistics capacity and systems. They then move equipment from site to site, in essence allowing them to not just increase the utilization and lower the cost of machinery operations, but to again relax the timeliness constraint on size of operation without investing in additional machinery or equipment.

One new business model is the use of operating leases or machinery sharing to cost effectively acquire additional machinery services. Such arrangements have typically been individual agreements between growers and machinery owners (sometimes dealers, sometimes other growers), but increasingly these arrangements are developing through more formalized custom farming agreements or with such entities as Machinery Link that provides operating leases for combines, cotton strippers and power units similar to rental arrangements for automobiles, trucks and other equipment.

Precision farming combined with creative ways to schedule and sequence machinery use including 24 hour-per-day operations, moving equipment among sites and deployment based on weather patterns has the potential to increase machinery utilization and lower per acre machinery and equipment costs as well.

Finally, more and more of today's expanding crop farmers are adopting the common business strategy of mergers and acquisitions compared to buying assets as in the past. Thus, farmers are buying businesses or the package of assets (including leased land) rather than purchasing individual partials of land or pieces of equipment. And in fact, an increasingly common growth strategy for some growers is to approach a current operator with say 1000 to 1500 acres of farmland, who is near retirement, offer to buy the "farm business," and retain the current operator and his/her machinery to complete the machine operations on that acreage. In essence, the acquiring farmer obtains control of not only the owned but also the rented acreage of the current operator, and also increases his capacity to farm this additional acreage by outsourcing some of the machine and other operations to a skilled farmer who likely is uniquely qualified to farm that particular acreage. This strategy of acquiring businesses rather than acquiring assets usually involves obtaining control over a larger asset base, and thus accelerates the rate of growth and consolidation of large scale operations.

Human Capital

The skill sets and capabilities of the managers/entrepreneurs in the industry drive many of the growth, technology choice and financing decisions that will have a significant impact on many dimensions of the future structure of the industry. Additional human capital dimensions that will be important include the adapting general business management skills to farming, the allocation of time to work and community activities, and career path opportunities of new entrants and current industry participants. Larger farm businesses with specialized managerial expertise are likely to have more time and talent to seek efficiencies not only in economies of input purchases but also in areas of learning, risk mitigation, and resource acquisition/control.

Business/Family Life Cycle

The production sector is currently dominated by proprietorship business structures where the life of the business is profoundly impacted by the life of the individuals who manage and contribute labor and capital resources to that business. Consequently the typical proprietorship business lifecycle stages of entry/establishment, growth and expansion, maturation, and exit characterize the industry, and combined with the demographics of the resource owners and operators, have a significant impact on the current and future structural characteristics of the industry. Furthermore, potential changes in the proprietorship model to a more "corporate" structure where the life of the firm is not as dependent on the life of the entrepreneur or his/her heirs have important structural implications. As the industry transitions from the current life cycle to the next life cycle it can be expected that the proportion of businesses using something other than the proprietorship model is likely to increase.

Much discussion of structural change in agriculture has focused on the increasing age of farmers and the expectation that significantly larger amounts of farm property will be transferred to other owners as these farmers retire or exit the industry. But the transfer of ownership of farmland may not be nearly as important and immediate as the transfer of control/operation of that farmland. USDA (2006) estimates almost 50 percent of U.S. cropland is rented; and in some parts of the Midwest the percentage rented is as high as 85 percent; thus, changes in control and operation of farmland may not mimic changes in ownership.

In contrast to the past, it is not unusual today for a farm operator at retirement to control a substantially larger acreage than he or she owns. So in reality a larger proportion of the total land becomes available to new or current prospective operators than just that acreage owned by the retiring farmer. Even though only two to three percent of farmland is transferred from the current to a new owner each year, the amount available for new operators each year is substantially more than that – maybe as much as 4-5% per year.

Value Chain Forces

A number of forces are now impacting the farming industry that have the potential to challenge the traditional open market based coordination system with buyers and suppliers and replace it with a more tightly aligned vertical coordination system. These forces include the demand for more unique and differentiated products from the production sector, concerns about traceability and identity preservation through the production and distribution channel, strategies to capture efficiencies of improved flow scheduling, benefits of better and more accurate information flows form users to producers, concerns about quality and quantity availability by processors and others downstream in the distribution channel, etc. As production agriculture becomes less commodity oriented and has to be more precise in the attributes it produces as well as the documentation of what and how products are produced, structural changes in the form of different coordination mechanisms between suppliers, producers and buyers are likely to occur. These business arrangements are frequently less costly to implement by larger scale firms that have the scale and perhaps scope to attract attention of potential partners in downstream activities.

The Leading Edge of Structural Change: Some Illustrations

The structural changes taking place in U.S. agriculture represent a shift to an industrial model much like the industrial revolution that took place in manufacturing in the U.S. over a century ago. This shift is not that new to agriculture in the sense that poultry has been essentially an industrial model for decades now. The pork industry underwent the same transformation in the late 1990's. Much of the fruit and vegetable industry could also be characterized as an industrial model. Traditional cash crops and dairy have been slower to shift to the industrial model but are increasingly moving this direction. The potato industry, for example, is now dominated by a few very large operations that produce potatoes in multiple states and even multiple countries. Figure 1 provides a summary of thirteen elements that typically characterize the management practices of farm businesses that are actively pursuing the industrial model.

Figure 1. Management Practices of the Industrial Farming Model

1. Adapt quickly to new technologies that are either cost lowering or value increasing.
2. Find the best technology and develop that into a standardized system of management.
3. Develop a standardized system of command and control or standard operating procedures.
4. Utilize alliances with "partners" both to learn from them, and also to extend the scope of the business.
5. Seek supply chain management strategies that maximize the value from farm inputs to the dinner table.
6. Create solutions to reduce costs or increase value with partners in the supply chain.
7. Pursue all avenues to gain economics of size.
8. Perfect a technology/management/scale structure and then replicate it in other locations or in other businesses.
9. Effectively use both debt and equity capital to continually grow the business.
10. Utilize automation and information technology to improve precision and systematically control production processes.
11. Focus on quality of product and consistency of production processes.
12. Recognize and emphasize buyer expectations in their choice of product and production practices.
13. Develop closed loop systems that utilize all resources, including waste, as efficiently as possible.

The following descriptions illustrate the increasing number and importance of large "leading edge" farming organizations that epitomize the industrial farming model. The four farm organizations were purposefully chosen in crop agriculture and dairy since these are the industries that are perceived to be the least dominated by the industrial model today. Certainly, these farming organizations do not represent today's mainstream U.S. agriculture. To be sure, the majority of farm businesses in the U.S. continue to be modest size 1 – 2 person sole proprietor operations. However, the case studies below provide a view of the potential future structure of agriculture in the U.S. as the industrial model becomes more commonplace.

Fair Oaks Farms

Since 2000, rural Newton County Indiana has been transformed into a leading diary producing county in the U.S. Both the Fair Oaks dairy (partially owned by the Bos family) and the Bos Dairy have been expanding dairy production on both sides of Interstate 65 between Chicago and Indianapolis during this time period. As of 2007, the combined dairies have approximately 70,000 cows in the area. The two operations are contiguous and share similar attributes but are managed separately. Here we will describe the Fair Oaks dairy operation.

Fair Oaks was started in 2000 with three dairy milking units milking 3,000 cows each on a 9,000 acre block of land. Since 2000, the farm has expanded to 10 milking units milking 30,000 cows using 72-cow circular milking parlors milking 24 hours a day 7 days a week. Fair Oaks estimates that they produce 4 million glasses of milk each day at the farm. There are a number of interesting features of this operation including a grass-to-glass concept of managing everything from production of crops for feed, to cow comfort, to energy production from waste materials. In addition, the farm has a cheese production facility, ice cream production facility, and a tourist department focused on educating people of all ages about the production of milk.

The farm's original marketing plan focused on producing fluid milk for consumption in Southeastern U.S. markets. The farm was strategically located on Interstate 65 to allow for efficient transportation of raw milk. The milk was transported to a processing facility in Louisville, KY. By processing the milk in Kentucky rather than Indiana, the farm enjoyed a substantial premium for its milk because the milk marketing order (MMO) for Kentucky was the Southeast MMO while Indiana was in the North Central MMO. This premium amounted to almost $2.00 per hundred weight at times. In addition, Fair Oaks focus on efficiency allowed the milk to be turned through the processing facility and placed back on the Interstate in time to reach grocery store shelves in places such as Tampa, Florida in 36 to 40 hours; faster than most dairies located in the Southeast could achieve.

Fair Oaks continues to pursue the Southeast market for a portion of its product. However, because management is concerned that the advantage created by the MMO's could disappear with changes in farm policy, they have diversified their product portfolio to include many of their own branded items including ice cream and cheese. Fair Oaks also plans to build a fluid milk processing plant; currently they sell their branded products to wholesale distributors. This form of vertical integration is a classic industrial management technique that large scale farms are increasingly pursuing.

Fair Oaks is an excellent example of the replication strategy being pursued by the cutting-edge farm managers of today's agriculture. The management team has determined that the most efficient plant size for milk production is a 3,000 cow milking plant. Each plant or pod has stalls and a milking parlor located in one footprint. The facility is self contained with its own animal housing, feed formulating and waste management facilities. The facility is also highly mechanized and computerized with each individual cows' feed intake, milk output, and critical medical history being tracked daily by computer. The farm uses the information to real-time diagnose problems with cow comfort and health to intervene at the earliest possible stage; much like a manufacturing plant would use process control charts and systems to mange production processes.

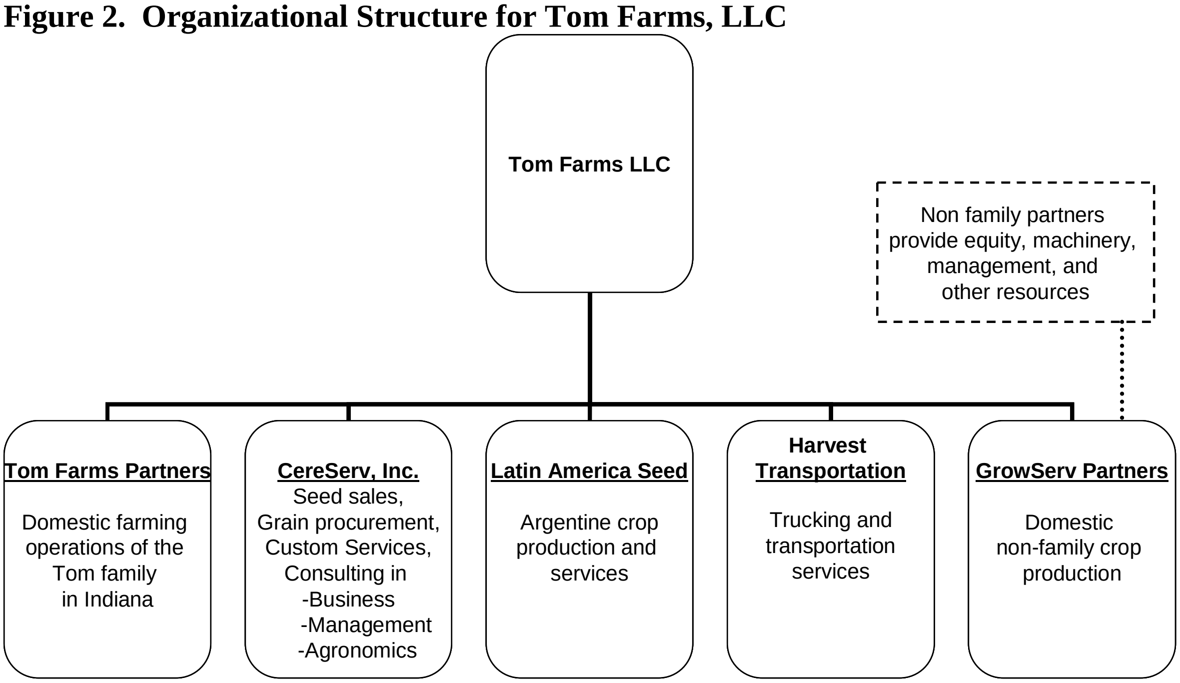
This highly linked production system for 3,000 cows is replicated as the farm makes expansion decisions. That is, this farm considers expansion of its production capacity in 3,000 cow increments. Each time it expands the exact same footprint is copied, cutting the learning curve time, construction costs, and time from concept to production substantially. The 9,000 acre block of land has room for multiple replications (10 already in place). This resource coupled with the management teams strong relationships with crop producers in the area to grow additional feedstuffs for the dairy operation under contract allows the organization to pursue continued growth.

Fair Oaks dairy is also pursuing the idea of the closed loop production systems. In addition to using the dairy waste for crop nutrients, Fair Oaks is also one of the largest dairies to currently employ a methane digester to produce a portion of the dairy's energy needs. In addition, they are in the planning process to build an Ethanol Plant on site that would allow them to create ethanol from the corn production and then use the wet distiller's grains as the feed for the dairy. The idea is to use every resource on the farming operation as efficiently as possible.

<u>Tom Farms LLC</u>

Tom Farms LLC is a 16,000 acre value adding crop farm composed of 12,000 acres in Indiana and 4,000 acres in Argentina. Crops include seed corn production, commercial corn, soybeans, tomatoes, and a business unit that provides customized agricultural services to an addition 28,000 acres, particularly in seed production. In addition, the farm operates a large commercial trucking business that provides transportation and brokerage services. Figure 2 provides an overview of the organizational structure of Tom Farms.

Figure 2. Organizational Structure for Tom Farms, LLC



Tom Farms is the largest provider of seed services in the U.S. and a major player in world seed markets. They are in an alliance with Monsanto for the production and distribution of Dekalb and Asgrow seed brands, with 4,200 acres of their own seed production in Indiana, and an additional 2,000 acres of seed production in Argentina. In addition, Tom Farms harvests an additional 10,000 acres of seed in the U.S., provides transportation for over 30,000 acres of seed production from the field to the processing plant, and then move $95 million of processed seed to retail locations throughout the U.S. Their 250 acres of tomatoes in Indiana are destined for Indiana's Red Gold tomato products.

Tom Farms articulates its vision of the industrialized agriculture model as paraphrased below on their web site http://www.tomfarms.com/ "Tom Farms puts people first. We treat all employees, customers, and suppliers honestly and fairly. We strive to build a business with a sustainable business structure for the future that improves the industry, the community and solves problems. We do this by quickly adapting superior technologies that deliver value, by fully utilizing resources to their maximum value, by providing our customers with products and services that add value and solve problems for them, and by operating on an industrial platform. The resources to do this include a highly qualified staff, efficient machinery, a large and high quality land base, and utilization of the latest technology."

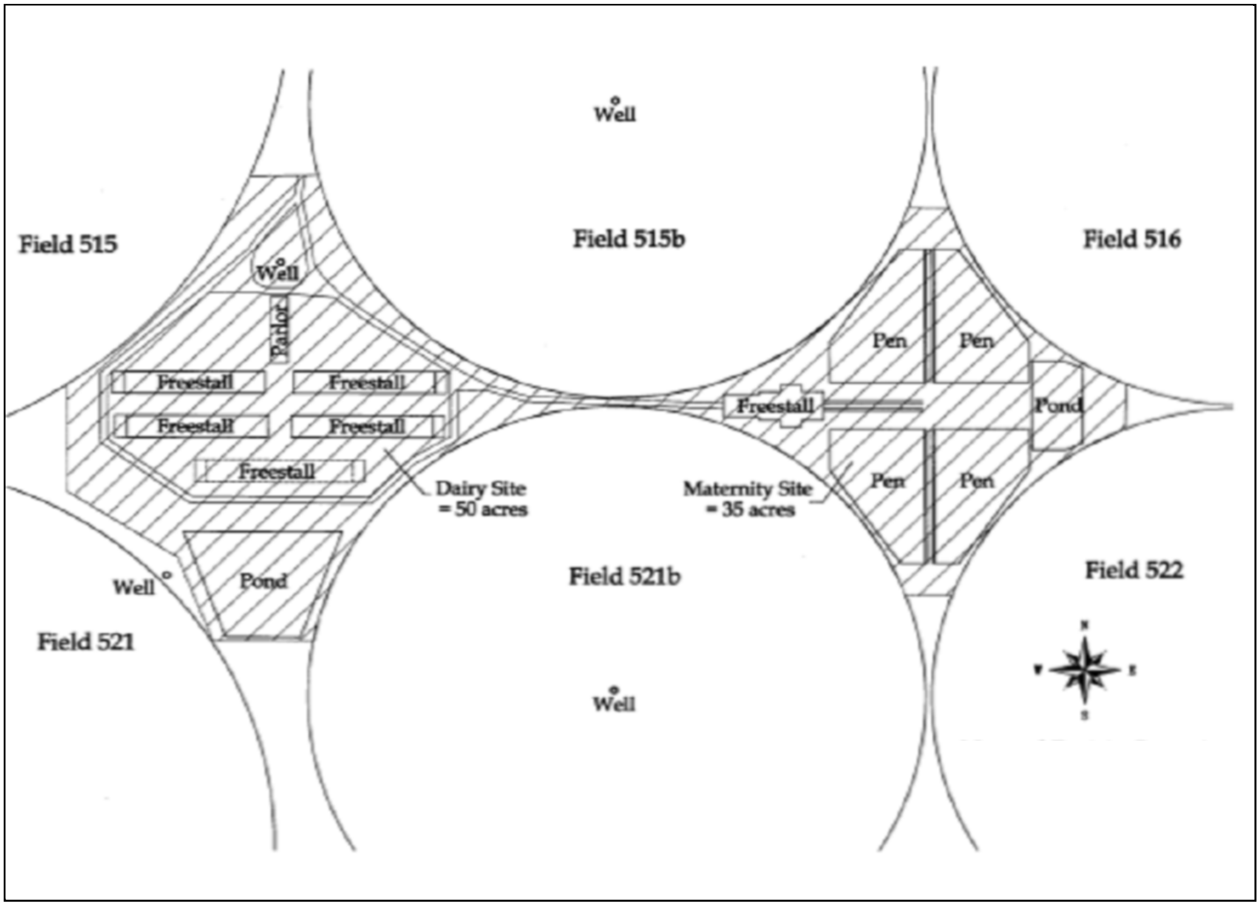
Tom Farms has focused on growth and return on investment rather than the accumulation of assets such as land. As a result they control the productive value of large land areas without the massive financial investment of ownership. However, this also means that over 90 percent of the land is leased and landlord relationships are critical to the success of the business.

West Texas Organic Dairy

In 2005, a group of investors and large dairy operators created a new farming operation in the Dalhart region of West Texas. The group searched out and purchased nearly 50,000 acres of native pastureland. This block of land was strategically located over the deepest part of the region's aquifer; providing for ample amounts of water. The group made large investments in center pivot irrigation in the native pastureland. These center pivots would be used to provide water for corn and soybean crops for the planned dairy operation.

Land in West Texas is surveyed in 640 acre blocks (exactly 1 mile by 1 mile square in most cases) providing the investment group with excellent field layout to create identical center pivots covering 160 acres each. The spaces where the center pivots do not reach have historically been considered low productivity areas. However, the investment group, through creative engineering, was able to design a 3500 cow dairy to fit in the space between the center pivots. A heifer replacement lot is placed in another "low productivity" area, and the maternity lot in another. Figure 3. Provides an illustration of the layout.

Figure 3. Layout of West Texas Organic Dairy



production. The center pivots surrounding the diary operation are used as pastureland for the dairy cows. Adjacent sections, also under pivot irrigation, are used to grow organic corn and soybeans to meet the feed needs of the dairy operation (approximately 5,000 acres are needed to meet the dairy's needs). The corn is used directly in feeding the cows both as silage and grain. The soybeans are processed under a toll processing arrangement with a soybean crushing facility in Kansas where the meal from the organic beans is sent back to the dairy operation in exchange for the crushing facility keeping all of the soybean oil.

By obtaining organic certification, the farming operation is able to create a unique marketing niche. The milk from the dairy farm is marketed, under contract, to a fluid milk company in the Eastern U.S. with a substantial market share in organic milk. This arrangement pays the farm a substantial premium over non-organic fluid milk. The dairy operators estimate that they are able to sell corn, in the form of organic-milk, at the equivalent of $7.00 per bushel. This provides the operators and investors with a strong cushion against current markets where Ethanol demand for corn has driven corn prices up substantially. Given this unique and profitable situation, the group has several additional sections (totaling almost 50,000 acres) under ownership with plans to replicate the 3500 cow dairy model up to ten times if market opportunities allow.

Louisiana Rice and Row Crop Farm

"Angelina" is a large plantation located in East Central Louisiana (Dorris, 2004). In total "Angelina" is approximately 26,000 acres of contiguous farmland with only 1 public road running through its boundaries. The operation was started by a wealthy entrepreneur who spent substantial resources to clear what was mostly forest land. Over time investments have been made in laser leveling several thousand cropland acres for rice production. In 2006, an investment group was able to purchase the operation at a substantial discount due to the investors need to liquidate his holdings quickly. The operation was purchased in its entirety including the land base, machinery, buildings, and storage capacity. The operation is now being run by a farm management company.

More than 80 percent of the operation is tillable land. In addition, the operation has excellent water access as well as direct access to the Mississippi River. The new ownership is currently implementing its strategic plan to laser level an additional 12,000 acres for premium rice production. The operation has contracts in place to supply high quality rice to two separate rice mills. These contracts are priced at a premium driven by the scale of production that Angelina is capable of, and the ability of the management team (a production manager that has been with the farm for years remains under employment) to meet both quality and timeliness requirements. The additional acreage on the farm is used to grow row crops and small grains.

The organization also plans to invest in a river terminal for both export of products and import of required inputs. In addition, experiments have been conducted to produce cotton and corn on beds in the laser leveled fields with promising results. If this technique continues to perform in field trials, the group plans to undertake an additional round of laser leveling for both rice and irrigated corn production, allowing further diversification of the product portfolio.

The uniqueness of this farming organization lies in the capital of the outside investors being combined with the specialized managerial expertise of the farm management company and operating managers. The investors have substantial capital and are willing to make large investments in improvements to the productivity of the operation including land improvements, machinery investments, and other physical capital. This willingness is driven partly by the fact that the original property was believed to be purchased at a discount. The farm management team has specialized talent in place to handle marketing activities, bookkeeping activities, and personnel management. In addition, a farm manager for Angelina that has been with the farm for more than twenty years brings needed "on the ground" experience. This unique combination of resources has resulted in the group being approached by another farming operation to the North of Angelina that is seeking to be acquired. This operation would provide another 30,000 acres of cropland with similar characteristics to the farming operation.

Implications of Structural Change for Agricultural Policy

The significant changes now occurring in production agriculture that are transforming it from the Jeffersonian model of small and modest size family farms to an industry characterized by larger production units that display the characteristics of the industrial model and biological manufacturing has profound implications for the debate concerning the appropriate agricultural policy of the future. This change in the characteristics of the production industry combined with increasing global production and competition, concerns about environmental and other externalities related to production agriculture, and growing interest on the part of consumers for safe as well as healthy foods has the potential to profoundly redirect the focus of agricultural policy debates. What might be some of the key issues in this new agricultural policy debate and discussion? And equally important, will the goals and objectives of agricultural policy be different in the future than they have been in the past?

Let's first look at the potential changes in the goals and objectives of agricultural policy in the future compared to the past. As exemplified and stated by every Farm Bill since the 1930s, the prime goals of agricultural policy have been to enhance or reduce the risk of low incomes for farmers; to keep agriculture from building up unmanageable surpluses; to protect land and other resources from degradation; and to provide U.S. consumers with adequate and nutritious food at reasonable prices and essentially eliminate the prospects of a U.S. food shortage. Generally, these objectives have been accomplished by a variety of farm programs that have buffered production agriculture from market forces, and in essence attempted to minimize the exit or dislocation of resources ─ both human and capital ─ from the sector.

Current Farm Bill legislation continues to focus heavily on the same goals and objectives as past farm bills. However, as the structure of the agricultural industry continues to move toward the industrial model, some of these policies may be in question. For example, much of crop agriculture in the industrialized agriculture, such as Tom Farms, relies heavily on concept of asset control rather than asset ownership. Current farm programs that rely on income transfers based on historical production and planting records are inevitably captured in land values and rents. For farms that pursue the economically rational goal of asset control rather than ownership, these policies represent a barrier rather than an enabler since they "artificially" raise the price of resources. Payment limitations, that restrict the amount of subsidies received and/or amount of production eligible (MILL payments for example) force businesses (many of them family-owned) to seek business structures that are economically inefficient but necessary to maintain access to government support mechanisms. Finally, government interventions such as milk marketing orders, designed for a dairy industry that is increasingly antiquated, create distortions in the marketplace that can sometimes become an advantage for industrial dairies (Fair Oaks Farms, for example), but may also be hindering the industries ability to shift to a business model that would maintain international competitiveness.

As one views the future from the perspective of a globally competitive, industrialized agriculture, additional goals of public policy with respect to the industry may become relatively more important than those that have been the focus of past policy. These goals might include:

1) Facilitating producers ability to manage the increasing risk and volatility that they will face in a more market-driven industry,
2) Maintaining or protecting the productive capacity of the land, capital and human resource base during periods of short-term surpluses for longer-term world-wide food security,

3) Facilitate the transition out of agriculture of permanently excessive human resources through jobs training and other transition assistance,
4) Maintain market access for producers in both input and product markets,
5) Protect farmers from potential exploitation by processors and input suppliers,
6) Facilitate a highly skilled work force and career path for employees.
7) Maintain and facilitate access to a seasonal labor force that can work in a safe and productive work environment,
8) Maintain adequate food supplies to minimize the probability of a food shortage or significant increases in food prices,
9) Protect consumers from any form of food contamination in the production/distribution channel,
10) Reduce environmental, odor and other externality conflicts between farmers and other members of society,
11) Enhance agricultural productivity, creativity and innovation,
12) Assist farmers and residents of rural communities in adapting to change and adjusting to new social and economic environments.

If these are some of the potential goals or objectives of farm policy in the future, what might be some of the agricultural policy and program options and alternatives? Our purpose here is not to specifically identify the details of a policy option or the institutional structure to implement a particular farm program, but to identify seven critical issues that farm policy of the future must resolve to accomplish the broader set of goals previously identified. These issues or alternatives are generally not part of the current policy debate and are presented not because they are fully developed and analyzed, but to stimulate new ideas and new thinking in policy discussions that have historically been dominated by variations of farm price and income support systems and resource conservation and protection programs.

1) Programs for transition/adjustment assistance ― As has been indicated earlier, markets sometimes inflict pain in the form of low compensation for resources. One role of public policy is to mitigate that pain through temporary assistance. But if the resources are in permanent surplus, public programs to facilitate transition of those resources to other uses are appropriate. For example, a program to assist farmers who may find permanently lower prices and incomes because of international competition or other forces might be providing job training and relocation assistance to transition from farming to some other occupation. This transition assistance approach may be the logical follow-on program to legislation that provides less buffering for farmers from market forces.

2) Institutional structure around vertical market systems and supply chains ― The development of tighter vertical alliances in agriculture and the formation of supply chains has raised numerous questions about the issues of market power and the potential for exploitation of those with limited size or market power, particularly producers. One public policy response would be to prohibit the formation of these vertical alliances. Such a policy might not only be difficult to implement, it might eliminate opportunities to develop a more efficient and responsive food production and distribution system. An alternative policy approach is to develop an institutional structure surrounding vertical supply chains (not unlike the institutional structure surrounding markets) that responds to the public policy concerns. Such a structure might include

open access to information on prices and terms of trade of all transactions whether they be within a vertically aligned chain or not. It might include redefining anti-trust legislation to acknowledge concerns about market power related to position in a vertical chain as well as market concentration and size. It might include provisions to minimize opportunistic behavior and exploitation by mandating compensation if, for example, contractual obligations in a vertical chain are not fulfilled. Another policy response would be to alter the power potential in negotiation between producers and others in vertical chains by increasing producer bargaining rights. And new arrangements and institutional structures for more equitable sharing of risk and rewards in vertical alliances as an alternative to fixed price contracts might be mandated or encouraged including various forms of profit and loss sharing arrangements. The fundamental principle here is to develop a new institutional structure to surround vertical systems of economic activity to eliminate the potential of power or exploitation so as to accomplish the same goal as the current institutional structure is to accomplish in a market environment.

3) Intellectual property rights ─ The recent advances in biotechnology and information technology suggest that information and intellectual property will be critical resources to enhance market position and generate economic rewards in agriculture in the future. In the past, much of the information and many of the new ideas for production agriculture were generated by public sector institutions ─ the Land Grant University System and the US Department of Agriculture. But increasingly, private sector firms are generating new innovations and information and capturing value from that activity by charging farmers technology fees, and generally limiting access to those who have the ability and willingness to pay for information and technology. Current patent and copyright law was developed in an era of open markets and a major role for the public sector in providing new R&D and information. These rules and regulations concerning intellectual property rights and information dissemination should be revisited given that the market is now being characterized by vertical alliances and linkages, global competition, and a significant role of the private sector in the development of new technology and the dissemination of information.

4) Support for public sector R&D ─ As noted earlier the private sector is playing an increasing role in the technology and information markets, and many are concerned about the distributional consequences of restricted or closed access to the latest and best information and technology. A critical public policy issue is the appropriate level of funding for public R&D, technology transfer and information systems and the adequacy of funding of those activities. It is unlikely that current funding sources will be adequate to expand support for public, open access R&D and information programs. New and creative ways of funding such programs are a critical public policy concern. Creative structures and public sector ─ private sector joint ventures should be part of this discussion, including the potential for taxing the profits from private sector intellectual property and directly allocating those revenues to public sector, open access research and information programs focused on those who may not have access to the latest private sector technology and information.

5) Worker health, safety and immigration – A modern agriculture will need to be competitive in attracting a skilled labor force. Public policy in terms of health care costs and coverage as well as worker safety rules that balance the private and public costs and provide reasonable working conditions will be important to attracting that labor force.

Immigration policy is particularly important to the agricultural sector as evidenced by the recent debate in the U.S. on the appropriate guest worker and immigration policy. Agriculture is becoming increasingly dependent on a foreign-born labor force, not just in vegetable and specialty crop production as in the past, but also in livestock production and increasingly in the cropping industries such as potatoes. Many of these workers are not documented which presents costs as well as uncertainty in terms of availability for planting, harvesting and other time critical tasks. And, undocumented workers may be reluctant to challenge unsafe working conditions and thus may be subjected to unfair treatment. Resolution of this uncertainty through immigration policy reform is critical to the economy opportunity and safety of this work force, as well as the cost competitiveness and long term viability of those agricultural industries that rely on this work force.

6) Food safety, traceability and additive use – Periodic food safety events such as the recent spinach and pet-food contamination and the continuing longer-run debate concerning BSE in beef and the trade restrictions that resulted emphasize the importance of food safety as a critical component of agricultural policy. Some argue that a large scale industrialized agriculture, in particular increased concentration of livestock in confined spaces combined with the therapeutic use of antibiotics, increases the potential of food contamination risk. Others argue that an industrialized production system has increased ability to implement monitoring and control systems to detect and mitigate animal health and food safety risks. Regulation of antibiotics and additives (including GMO's) in production, processing and preservation of food will be important to maintaining a cost competitive industry, but also to maintain and enhance consumer confidence in food products and market access in countries or locales that limit the use of these technologies.

Traceability systems play a critical role in both preventing food safety problems as well as mitigating the exposure if a problem occurs. In animal production in particular, Canada is well ahead of the U.S. on identification and traceability systems to identify and trace animal and product flows through the food chain. A critical policy issue in the future is the public's role to develop, facilitate or mandate identification and traceability systems to respond to natural and intentional disease outbreaks, improve food safety and provide assurances to consumers as to the attributes and the quality of their food products.

7) Next generation agricultural leaders – The common approach in U.S. policy for enticing new generations into agriculture consists of low interest loans and loan guarantees. The design of these programs is to ease the barriers to entry in agriculture. Unfortunately, they also promote the concept of having young farmers take on large amounts of debt to acquire fixed assets including land and machinery. Current proposals for the 2007 Farm Bill include additional decoupled income support payments for young and beginning farmers and limits on the impact of 1031 tax exchange purchases of farmland to ease pressure on land prices.

The changing structure of the agricultural industry provides an alternative method for young farmers to enter the agricultural production industry. Today's industrialized farms, like those described above, often have entry-level management opportunities with well-defined career paths for young people to pursue. These opportunities might serve as an "apprenticeship" for tomorrow's leaders in agriculture where they have the opportunity to learn how to operate what are most likely to be the farms of tomorrow. Agricultural policy that encourages this career path to farming could be accomplished through grants, scholarships, and low-interest loans for higher education opportunities in farm management and production related areas, and tax incentives to farm organizations that hire young college graduates into career-path oriented management positions.

A Final Comment

The seven areas of public policy identified here have not been the focal point of agricultural policy debates and discussion in the past. But they may be equally if not more important than traditional farm price and income support and resource conservation programs in shaping the efficiency and opportunity for the agricultural production and distribution system in an increasingly globally competitive market in the future. The future policy debates in agriculture must be much broader in focus and concept to respond to the critical public policy issues that will face the food production and distribution system in the future.

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